DOCUMENT RESUME

ED 172 954 PS 010 735

AUTHOR Kienapple, Kim; Lange, Garrett
TITLE What and How Preschool Children Remember in Early Childhood Education Settings.
PUB DATE Apr 79
NOTE 35p.; Paper presented at the National Conference of the Association for Childhood Education International (St. Louis, Missouri, April 8-13, 1979)

EDRS PRICE MF01/PC02 Plus Postage.
DESCRIPTORS *Child Development; Early Childhood Education; *Educational Experience; Learning Processes; Memorizing; *Memory; Preschool Children; Recall (Psychological); Research; Retention
IDENTIFIERS Recommendations

ABSTRACT

Written for professionals who design and teach in preschool programs this paper reviews research on memory abilities of young children and examines the relationship between knowledge and memory among preschool children. Preliminary research of the hypothesis that elementary school environments press children to develop memory strategies is reported. Parents of preschool children and teachers of pupils in the primary grades were interviewed and surveyed. Questions focused on home and school learning, memorization requirements at home and at school, and parent and teacher behaviors related to memorization demands. Data provide some support for the schooling press hypothesis. The memory abilities of the preschool child are characterized as unintentional and bound to the immediate and concrete goals of the activity in which the child acts. Preschool children do not seem to conceptualize memory activities as a distinct part of the on-going activity. Since preschool children do not realize the need to remember as they enter a situation, the adult must first present and emphasize the importance of remembering. Memory tasks should be arranged within the context of some activity that is meaningful for the child. Preschool children do not consciously employ memory strategies. Adults should provide situational means for remembering. (Author/RH)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

ED172954

U S DEPARTMENT OF HEALTH,
EDUCATION & WELFARE
NATIONAL INSTITUTE OF
EDUCATION

THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL NATIONAL INSTITUTE OF EDUCATION POSITION OR POLICY

What and How Preschool Children Remember in Early Childhood Education Settings

Kim Kienapple and Garrett Lange

Department of Child Development and Family Studies

Purdue University

PS010735

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY

Kim Kienapple

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

Paper presented at the annual meeting of the Association for Childhood Education International, St. Louis, April 1979.

What and How Preschool Children Remember

in Early Childhood Education Settings

Recently there has been an increase in research dealing with the developmental competence of preschool children in various areas. The results of much of this research, while important to those who design and teach in preschool settings, have not been made available to professionals. This paper is an attempt to review and present recent research concerning the development of memory abilities of preschool children in such a manner that professionals involved in preschool programs can take advantage of it in the design and operation of their programs.

The memory abilities of preschool children can be characterized as unintentional. Children at this age remember what they do through concrete experiences with the remembered materials, not by setting deliberate goals to remember and not by using planful strategies to achieve these goals as is common in adults. Memory development occurs as the child gradually begins to set goals and employ strategies to meet these goals.

Although the preschool child's memory abilities are still developing, a child at this stage of development has made many impressive memory-related accomplishments. A preschool child can use language effectively; is able to recognize familiar people, places and objects; can reconstruct meaningful occurrences; and can understand and employ a wide range of concepts. With these accomplishments in mind, we want to clarify the types of memory skills these activities do and do not entail, and the types of memory changes we can expect to see in young children as they enter the formal schooling period. More specifically, the following presentation will focus on (1) the nature of memory and the manner in which we study it in children; (2) the

kinds of memory and their level of development in young children; (3) the effect of knowledge on memory; (4) what good memory requires; and (5) some applications for the preschool setting.

What Is Memory and How Do We Measure It In Young Children?

We can think of memory as a set of abilities and internal mental processes that enable us to recover past experiences (or more properly, stored representations of experiences) in the "here and now." This definition implies two basic abilities. One is the ability to get on-going experiences stored for future reference. This is more easily said than done, since we do not automatically store everything we perceive, and as we shall emphasize later, the young child is far more concerned with enjoying his/her experiences than with figuring out means to make permanent records of on-going experiences for later reference. The other fundamental ability implied by a definition of memory has to do with retrieval, that is, getting represented experiences out of storage -- remembering them. This can also be a difficult process since there are times when we have to go to great lengths to probe ourselves to remember something that we have seen or heard several times before and have tried to study and memorize for future reference.

To better understand the storage and retrieval functions of memory, it is helpful to have a model, or a general way of thinking about how the human memory system works. Most contemporary experts (e.g., Atkinson & Shiffrin, 1968) view the memory system to have two general sets of features. "Structural features" concern such aspects as short-term storage, long-term storage, etc., features that may have a basis in neurophysiological and anatomical structures. Researchers of children's memory development have not emphasized this aspect of memory since there is a good deal of evidence

to suggest that the types of memory changes that occur in children do not appear to have a physical basis. The other set of features that we have to take into account when thinking about the human memory system are referred to as "control processes." Here we are talking about "tricks" or strategies that the memorizer uses to get information into memory (i.e., at storage) and out of memory (i.e., at retrieval). It is with these processes that researchers have spent most of their efforts in attempting to understand children's memory development.

How Do We Study Changes in Children's Memory Development?

Most of our studies of children's memory abilities have taken place in laboratory settings rather than in the child's natural environment. We are not proud of this fact since some of what we have to say today indicates that young children are likely to exhibit better memory performance when operating in their natural environments than when under the constraints of laboratory conditions. Nevertheless, the laboratory does allow more control over the phenomena we are studying and has yielded some rich information over the past ten years.

Before deciding on a method of study, one has to be clear on the type of memory that is to be studied. The kinds of memory that develop during the preschool years are essentially the same in character as those adults use, the only difference being the effectiveness with which the child uses each type at different ages. There is recognition memory or the child's ability to recognize objects or events seen or heard before. For example, an infant who smiles when he sees his mother, or the preschool child who yells out "Big Bird" upon seeing a stuffed resemblance of the Sesame Street character in a toy store, shows recognition memory. Reconstruction memory

is the ability to reconstruct from memory an object or event so as to restore it to its original or intact form. In this case the child associates words not only with objects, but with his/her movements. For example, when we fail to remember the directions necessary to get to someone's house, it is often helpful to take a preschool child who has been there before since the young child is particularly proficient at associating visual landmarks with appropriate actions, e.g., "The white house on the corner lot with a left turn." Finally, recall memory is the ability to recall from memory (usually verbally) a name or symbol of some object or event that was seen or heard at an earlier time. This might occur when the child attempts to remember (recall) the name of an unusual animal or where he last left a toy he now feels he needs to complete a play situation.

To study recognition memory, we typically show children a series of 15 or 20 objects or pictures of objects. After the presentation period, we test the children by showing them 30 or 40 pictures or objects, half of which they have seen earlier and half they have not seen. We might present the test items one at a time and ask the children to tell us in each case whether the item is an "old one" or a "new one." Sometimes we will present two at a time during the test period and ask the child to tell us which of the two he/she saw earlier.

Reconstruction memory can be examined by first showing the child an intact object made up of smaller parts, the object is then disassembled, and at test, the child is asked to reconstruct or restore the object to its original intact form.

Recall memory is assessed by first showing the child a series of objects or pictures of objects, just as was the case for the recognition memory task.

However, in this case the pictured objects are removed from the child's view and the child is tested by being asked to recall from memory as many of the names of the items as possible in any chosen order. This task is the most difficult for young children since there are no external cues available during the test period to help the child remember. Thus, each of these three types of methods is used to assess a different aspect of the young child's ability to recover past experiences, i.e., to remember or memorize.

Age-Related Improvements in Children's Recognition, Reconstruction and Recall Memory

With these definitions and examples in mind, the reasons for the developmental trend from recognition to reconstruction to recall become clear. Recognition simply requires that the child decide whether or not he has seen a now present object or situation before. Reconstruction first depends on the recognition of something such as when the child attempts to redo a jig-saw puzzle he or she must recognize it as one that was attempted previously, but in addition, requires that the child be able to remember an action pattern associated with that recognition. Recall implies the conscious production of a mental image or word in the absence of any object or word that would stimulate recognition. For example, in order to help a policeman return a lost child to his home, the child must be able to recall his address or phone number in the absence of any cues.

Recall abilities first become apparent in the preschool period, but since recall is heavily influenced by strategies, its full development occurs in the later school years. More will be said about strategy use in a later section.

Let us consider each of the three types of memory in a little more

detail. Recognition has its beginnings in infancy. Infants as young as three to four months have demonstrated recognition memory for faces, pictures and sounds. So it is little wonder that the preschool child is very proficient in recognition type tasks. Although there is some evidence of improvement in recognition skills during the preschool years, the percent of recognized items is generally quite high. Two-year-olds, on the average, recognize better than 80 percent of previously presented materials, and this climbs to over 90 percent in four-year-olds, which is similar to that achieved by adults. In terms of whether the to be recognized material is presented visually or verbally, preschool children show a greater ability to recognize visual presentations. This suggests that for the preschool age group, materials may be easier to recognize if you present them visually, but verbal presentations should not be neglected since the child needs to gain experience in this medium.

The second type of memory reconstruction represents a transition between recognition and recall. Reconstruction was defined as recall mediated by actions instead of recall of mental images. A description of some of the experiments used to explore the operation of reconstructive memory will make the concept of reconstruction clearer. One procedure involves the reproduction of a series of geometric figures either by drawing them from memory (recall) or drawing them with the disassembled figures present (reconstruction). The results of these types of studies clearly show that preschool children are better reconstructors than recallers. Another approach used is one in which more realistic materials are used. This procedure is concerned with the preschool child's ability to reconstruct versus recall the order of events in a story. The recall condition again requires the child

to retell the story without any material aids. In the reconstruction condition, the children are presented with pictorial representations of events in the story in a scrambled order. Their task is to rearrange these pictures to resemble the order of occurrence in the story. The children who reconstructed the story maintained the order of events better than the children who recalled the story. Besides demonstrating that children of this age are indeed better reconstructors than recallers, the procedures of this study also indicated that it is the child's poor recall abilities rather than a poor understanding of order that accounted for the differences (Brown, 1975b). The research on children's reconstructive memory abilities also demonstrates that providing a preschool child with manipulable memory aids is an effective way to tap emergent recall abilities.

Although recall, or the ability to regenerate an image or name of an object in the absense of that object, first becomes apparent during the preschool period, children at this age are limited in their recall abilities for a number of reasons. Let us first look at what a recall task requires. Typically, the task situation involves presenting the child with some objects or pictures to be remembered. Then a buffer task (i.e., naming colors) which is designed to draw the child's attention away from the materials, is administered, after which the child is asked to recall the previously seen materials in the absence of the materials. In these types of laboratory situations, young children's recall is poor. Table 1 shows just how poor recall is during the preschool period. The second and third rows in Table 1 show that recall increases in situations that are more meaningful for the child. These results are from an experiment in which the child was either instructed to remember directly or the child had to discover on his/her own

that remembering was required in the course of a play or practical activity. The child had to identify "on his own" the goal of remembering in order to complete the task and in situations that directly involved the child, the child performed better.

One factor that hampers recall in preschool children is the young child's lack of deliberateness in approaching a memory situation. This will be dealt with in a subsequent section so it will suffice to say that at this stage the child is not deliberate. The verbal requirements in a recall setting may also be responsible for lower recall performance among preschool children. This lack of ability in the verbal area was reported in the recognition studies also. Recall may also demand greater intellectual processing (breaking the input down into basic meaning levels) than recognition or reconstruction performance which young children may not carry out because they are not aware of the need to do so. Finally, young children do not make use of tricks and strategies to aid their recall which have been found to greatly increase recall ability. The research on recall indicates that while the young child's recall abilities are generally poor, they may be improved by presenting the material in the context of a meaningful activity with the material to be recalled organizable along some dimension.

Knowledge and Its Effect on Memory

In a situation that requires the use of memory, the young child has at his disposal certain types of knowledge that serve to facilitate the kinds of memory discussed earlier. There are three categories of knowledge that affect memory ability (Brown, 1975a). The first, referred to as "knowing," refers to the knowledge one has about the objects and events in the world. For example, world knowledge tells you that keys are used to open locked

doors, and memory tells one which key opens the office door. "Knowing about knowing" is a second type of knowledge that affects our memory. This type of knowledge is the introspective knowledge that one has about how his memory system functions. The knowledge that when one wants to remember a phone number he must make some effort to remember it, rather than just glancing at the number once, exemplifies this type of knowledge. The third type of knowledge Brown calls "knowing how to know." This refers to a repetoire of strategies and skills employed to enhance remembering. These strategies will be discussed in the section entitlted What Is Required for Successful Memorization.

Knowing. Even at the preschool age a child's previously acquired knowledge about the world influences what the child is likely to store in memory and remember. This means that information that has some meaning for the child or that can be organized around existing knowledge will be better retained and more easily available for future recall. For example, telling a child that his/her mother will be home after work will be better understood by the child if the child has a good grasp on the concept of object permanence (i.e., the concept that mother exists and acts whether or not she is visibly present). This organizational process is based on Piaget's concept of assimilation. The preschool child has a natural tendency to relate new information to similar, already attained, knowledge in a way that is sensible and meaningful. Thus, what the child retains is not a veridical copy of the new information, but rather an organized representation of the gist of the new information in relation to his previously stored knowledge. In other words, the child may remember a hammer and saw because he/she knows what they are used for and has seen them used by significant others in the home environment.

Piaget and Inhelder (1973) have demonstrated the effects of knowledge on memory through the use of seriation (or ordering) tasks. It was Piaget's hypothesis that the child's general knowledge about the nature of seriation (objects arranged in order of magnitude) helps him/her accurately store and subsequently retrieve from memory the appearance of a particular ordered arrangement of objects. Therefore, as the child further understands seriation, his memory improves since he is better able to reconstruct the ordered series of objects. The effect of knowledge is also evident in recall tasks that require children to complete a part-whole relationship such as completing room settings in a doll house (Meyers & Perimutter, 1978). If they have some previous experience with furniture arrangements in the house, they are more likely to remember that beds belong with a chest of drawers rather than with a kitchen table.

It also appears that the use of categorical relationships facilitates recall in the two- to four-year-old age group (Meyers & Perimutter, 1978). That children in this age group are just beginning to use categories as a means of organization is demonstrated by children who encode items according to categories (i.e., foods, clothing, animals, etc.), but are unlikely to generate and use category cues to provide access to their memory in a recall situation. When these children are provided with category cues, it is found that their recall is enhanced.

An understanding of how knowledge mediates memory at this young age can be used to construct situations that will make remembering easier for the preschool child. This can be done by relating to-be-remembered objects to a category or grouping that is already meaningful for the child. This grouping can be achieved in a number of ways. Three of the most effective

grouping procedures for this age group are: (1) having the child actually use the objects jointly, i.e. in interaction with one another; (2) having the child observe the objects interact for the fulfillment of an activity; and (3) providing, verbally, meaningful descriptions and definitions to the child that relate the objects to their specific categories.

Table 2 shows the results of a study that required children to (1) recall the names of a randomly arranged set of objects and (2) recall the names of objects that were either familiar to the child or unfamiliar to the child. The results demonstrate how meaningfulness interacts with memory material to produce increased recall in the preschool child. There are various ways to group material for different age groups. Suffice it here to say that material can be made more meaningful to the child if it is grouped according to some functional or story theme rather than taxonomic or categorical groups.

Knowing About Knowing. The preschool child knows little about the functioning of his own memory system and also does not seem to employ automatically what little knowledge he does have. This is demonstrated by the observation that besides not knowing how to memorize efficiently, the child does not seem to realize that he needs to try to memorize. These young children seem to operate under the naive expectation that whatever they experience can be remembered without any additional effort. This naiviete has been demonstrated by Monroe and Lange (1977), who have shown that children at this age take very little time to study memory materials, yet predict they will recall an unrealistically high number of objects.

It is clear from the earlier discussion that if the child is required to only recall the gist of the material or if the material is meaningful to the child, recall is better. However, when the material is not inherently

meaningful or exact reproduction is required, the child has difficulty because he is not aware that deliberate strategy use is required. What the preschool child is lacking is not necessarily any specific skill, but rather the knowledge that these skills are to be deliberately used.

What Is Required for Successful Memorization?

We have just said that the young child is not planful or deliberate about the task of remembering. What we want to emphasize here is that this disposition changes with age. As children reach six and a half or seven years of age, they begin to show obvious signs of deliberateness and planfulness in getting things stored in memory. For example, they begin to use such strategies as verbal rehearsal (i.e., repeating the names of objects over and over again until the names are in semi-permanent memory) and stimulus organization (i.e., grouping similar objects and pictures together) as means to aid the memorization process. They sometimes use what we refer to as "item-elaboration" and "story-elaboration" which amounts to thinking about objects in ways that make the objects more meaningful in light of the child's past experiences and thus easier to remember. In other words, as children grow older, they begin to understand that memorization is not an automatic outgrowth of attending to something, but rather that it requires deliberate strategy activity if it is to be successful.

Since we do not see young children using these planful strategies, and in fact, do not see evidence of children's intentions to use stimulus organization as a mnemonic strategy throughout most of the elementary schooling period, some parents and teachers have asked if children can be trained to use such strategies. The results of training studies have been disappointing, at best. Those who work closely with young children in research settings

know that young children will do nearly anything they think you want them to. And so it is with mnemonic strategy usage. When we instruct a young child to use a particular strategy in a laboratory research setting, the child shows little hesitance in using the strategy and, as a result, typically improves his/her memory performance dramatically. There is no question in our minds that the young child is capable of using adult-like memory strategies successfully when prompted by a strange adult. After training, however, when we show the child a new set of pictures or objects to remember, and do not explicitly instruct the child to use the strategy, he/she typically does not use the strategy that achieved such good results just moments earlier. In other words, the child seems to be capable of adult-like memory-strategy behavior, but is not inclined to resort to such strategies on his/her own, even when aware of their effectiveness for remembering improvement.

What accounts for these so-called "production failures" after training tasks? We have to realize that the young child does not have the same motivations and goal orientations that older children and adults do. Some of us, in the past, have assumed incorrectly that, like the adult, the young child is anxiously awaiting to become familiar with how mnemonic "tricks and strategies" that can be used to improve performance, and that once familiar with such powerful strategies, the child will make instant use of them on his/her own without being instructed. This assumption is quite incorrect. The young child does not have the same concerns with efficient and successful remembering that characterize older children and adults. Rather, the young child seems to be engaged primarily in the enjoyment of learning materials presented and less, if at all, concerned with developing means to make permanent representational records of the materials for future memorial

reference. In other words, if there is no strong goal for successful achievement in a remembering task, why should we expect the young child to actively and deliberately search for strategies to aid the remembering process?

But how can we explain why children become planful and strategic about their remembering during the elementary school years? What happens during this period that induces children to become strategic memorizers? The most frequent and reasonable explanation has to do with the cumulative influence of formal schooling on cognitive task performance. We refer to this position as the "schooling hypothesis." Recently several theorist-researchers (Brown, 1977; Cole & Scribner, 1975, 1977; Stevenson, et al., 1978) have argued that children's early use of cognitive strategies in general, and memory strategies in particular, develop in direct response to experiences and demands that characterize formal schooling environments during the elementary school years. Brown (1975) distinguishes the educational requirements of preschoolers and school-age children in this way.

> Prior to the school years, the child has existed without the need to employ deliberate strategies of remembering. The child has managed to acquire a language; he can comprehend an impressive set of conceptual relations; he can recognize familiar places and people and reconstruct meaningful events without the need to employ strategies. His emergent knowledge system is such that he can reconstruct the essential features of his past and deal intelligently with his present. It takes time for him to recognize that these, in some sense artificial, situations exist and demand that he respond with something more

> than has been required in the past. He must, in fact, recognize that because of the nature of the material and the need for exact reproduction, he must apply a deliberate strategy or he will fail to retain the material (Brown, 1975, p. 112).

In a more recent paper, Brown (1977) reiterates this position.

> Outside the school setting, in unschooled populations including that of the preschool child, such activities (i.e., the learning of study and memory skills) are rarely if ever encountered. Deliberate remembering as an end in iself rather than as a means to achieve a meaningful goal is very much a school-inspired activity (Brown, 1977, p. 248).

Notwithstanding the logic of these and other views, to date, no empirical research has been conducted to formally assess the memory-related demands and experiences of children in elementary school setting, much less those encountered by children in home environments.

At Purdue we have begun to examine the schooling hypothesis in a very preliminary way by interviewing and surveying parents of preschool children and teachers of pupils in the primary grades. The survey we are using is a six-part instrument which requires 30 to 40 minutes to complete. It contains questions focusing on the types of information or knowledge parents and teachers believe a child should learn at home and at school, the degree that parents and teachers teach for memorization and actually require memorization of children (pupils) at home or at school, the manner in which parents and teachers put their memorization demands in practice, and several other types of information.

Tables 3 and 4 and Figure 1 summarize some of the data gathered in this

study and provide some support for the schooling hypothesis. Note that although parents and teachers alike claim to teach a great many types of information to children, in most instances teachers are more likely than parents to require memorization of the information. This is particularly apparent for knowledge of a conceptual nature.

Moreover, Table 4 shows some comparisons that we believe to be particularly important. For question numbers 4 and 8, we find that teachers are far more likely than parents to warn young children ahead of time that they will be tested (#4) and rewarded (#8) for successful memorization. The importance of these findings stems from the fact that a most powerful method for inducing children to resort to tricks or strategies to improve remembering is to impress upon them that they, and only they, are responsible for the memorization process. Once a child recognizes this and begins to appreciate the need to perform well in remembering situations, we suspect that young children, perhaps for the first time, will begin to develop or adopt from other means to aid their remembering activity. Obviously, we are at a very preliminary stage in the study of the effects of the family and the formal schooling environment on children's memory-strategy-development, but plan to pursue this issue more rigorously in the future.

Applications

From the preceding discussion, the memory abilities of the preschool child can be characterized as unintentional and bound to the immediate and concrete goals of the activity in which the child finds himself. Preschool children do not seem to conceptualize memory activities as a distinct part of the on-going activity. That is, they often do not realize the need for goals or means of remembering. Since the preschool child does not consciously

possess the goal of making permanent records of experiences and does not yet use strategies to store and retrieve memory materials, the following procedure is suggested to aid the preschool professional in helping the preschool child make the most of his memory abilities.

The teacher can exploit any naturally occurring meaningful situation for assisting the child to remember by following this procedure. Since preschool children do not realize the need to remember as they enter a situation, the adult must first present and emphasize the importance of remembering. This can be done by informing the child that he/she will need to remember what is presented in order to successfully complete the task. Another effective approach is to structure the situation so that the child needs to remember some previous activity or object in order to continue an interesting and pleasurable task or play activity.

At this age children do not remember for the sake of remembering. Therefore, the memory task should be arranged within the context of some activity that is meaningful for the child. The activities within preschool programs provide many situations that have meaning for the child. The teacher can easily adapt many situations to ones that challenge the child in the use of his/her memory abilities.

Finally, preschool children do not consciously employ strategies. Therefore, the adult should present a means for remembering that the child can employ in the situation. There is no single most effective strategy for all children in all situations. However, verbal rehearsal can be incorporated into a game-like situation much like the way the song "Old McDonald's Farm" requires rehearsal of animal names. Another possible strategy is to have animal characters act out the to-be-remembered activity in the context of a

story which is simple enough for the children to remember.

This review and proposals have been an attempt to communicate research findings in the area of memory development to the professionals who interact with preschool children. We hope that this presentation will be useful and that it will encourage other researchers to make their research known to the professionals who design and teach in preschool programs.

References

Atkinson, R. C. & Shiffrin, R. M. Human memory: A proposed system and its control processes. In K. W. Spence and J. T. Spence (Eds.), The psychology of learning and motivation (Vol. 2). New York: Academic Press, 1968.

Brown, A. L. The development of memory: Knowing, knowing about knowing, and knowing how to know. In H. W. Reese (Ed.), Advances in child development and behavior (Vol. 10). New York: Academic Press, 1975. (a)

Brown, A. L. Recognition, reconstruction and recall of narative sequences by preoperational children. Child Development, 1975, 46, 156-166. (b)

Brown, A. L. Development, schooling and the acquisition of knowledge about knowledge: Comments on Chapter 7 by Nelson. In R. C. Anderson, R. J. Spiro and W. E. Montague (Eds.), Schooling and the acquisition of knowledge. Hillsdale, New Jersey: Lawrence Erlbaum Associates, 1977.

Cole, M. & Scribner, S. Cross-cultural studies of memory and cognition. In R. V. Kail and J. H. Hagen (Eds.), Perspectives on the development of memory and cognition. Hillsdale, New Jersey: Lawrence Erlbaum Associates, 1977.

Monroe, E. K. & Lange, G. The accuracy with which children judge the composition of their free recall. Child Development, 1977, 48, 381-387.

Meyers, N. A. & Perlmutter, M. Memory in the years from two to five. In P. A. Ornstein (Ed.), Memory development in children. Hillsdale, New Jersey: Lawrence Erlbaum Associates, 1978.

Piaget, J. & Inhelder, B. Memory and intelligence. New York: Basic Books, 1973.

Stevenson, H. W., Parker, T., Wilkinson, A., Bonnevaux, B., & Gonzalez, M. Schooling, environment and cognitive development: A cross-cultural study. Monographs of the Society for Research in Child Development, 1978, 43, No. 3 (Serial Number 175).

Table 1

Average Number of Recalled Words (out of 5)

Condition	Age (years) 3-4	4-5	5-6
Laboratory types of tasks	1.6	1.5	2.0
Fulfillment of a play assignment within playful activity	1.0	3.0	3.2
Fulfillment of an assignment within practical activity	2.3	3.5	4.0

Table 2

Effect of Understanding Material on Memorizing

Age (years)	Mean number of recalled words (out of 5)	
	Quite Familiar	Not Familiar
3-4	1.8	0.0
4-5	3.6	0.3
5-6	4.6	0.4

Adapted from Zaporozhets & Elkonin, 1971.

Table 3

Percentages of Parents and Teachers Who Purport to Teach and Require for Memory Each Knowledge Type Listed in Section II of the Parent and Teacher Instruments

	Parents (N=172)			K-1 Teachers (N=41)			2-3 Teachers (N=41)			Knowledge Type
	T	R	Diff	T	R	Diff	T	R	Diff	Names of People and Things
1.	.53	.15	.38	.20	.07	.13	.07	.12	.05	family and friends
2.	.38	.04	.34	.10	.05	.05	.10	.00	.10	doctors, dentists, storekeepers
3.	.25	.01	.24	.15	.10	.05	.07	.00	.07	book, TV, and movie characters
4.	.59	.12	.47	.39	.05	.34	.15	.05	.10	appliances and tools in the home
5.	.64	.19	.45	.49	.27	.22	.12	.02	.10	foods, drinks, and clothing
6.	.70	.09	.61	.76	.22	54	.27	.10	.17	farm and zoo animals
7.	.54	.06	.48	.46	.07	.39	.24	.00	.24	vehicles, machines, and tools
8.	.46	.15	.31	.34	.05	.29	.42	.17	.25	plants and trees
9.	.30	.05	.25	.49	.63	.14	.27	.37	.10	addresses and telephone numbers
10.	.64	.26	.38	.54	.05	.49	.46	.12	.34	people's occupations and trades
11.	.79	.22	.57	.73	.76	.03	.39	.56	.17	numbers and alphabet letters
12.	.38	.02	.36	.09	.02	.07	.46	.22	.24	cities, states, and countries
13.	.78	.15	.63	.61	.37	.24	.54	.29	.25	parts of the body
14.	.65	.05	.60	.80	.46	.34	.71	.71	.00	days, months, and seasons
15.	.80	.19	.61	.76	.71	.05	.39	.44	.05	colors and shapes
16.	.45	.01	.44	.44	.10	.34	.46	.12	.34	natural events
17.	.38	.00	.38	.29	.00	.29	.34	.07	.27	scenic and historical sites
18.	.34	.01	.33	.17	.02	.15	.17	.05	.12	ethnic, racial, religious groups

Table 3, cont.

	Parents			K-1 Teachers			2-3 Teachers			Knowledge Type
	T	R	Diff	T	R	Diff	T	R	Diff	Rules
19.	.88	.56	.32	.93	.51	.42	.78	.56	.22	care of home/school property
20.	.89	.71	.18	.88	.56	.32	.83	.54	.29	rules of safety
21.	.89	.56	.33	.83	.34	.49	.73	.37	.36	personal and physical hygiene
22.	.86	.58	.28	.88	.46	.42	.85	.59	.26	conduct in parents'/teacher's absence
23.	.86	.54	.32	.90	.44	.46	.68	.42	.26	behavior with people and animals
24.	.81	.32	.49	.85	.46	.39	.73	.39	.34	using tools, utensils, and appliances
25.	.80	.45	.35	.95	.63	.32	.71	.61	.10	where to put objects when finished
26.	.74	.28	.46	.93	.58	.35	.63	.51	.12	where to find objects when needed
27.	.62	.14	.48	.51	.17	.34	.63	.46	.17	rules of speech
28.	.43	.05	.38	.76	.44	.32	.80	.68	.12	rules of arithmetic
29.	.60	.05	.55	.83	.27	.56	.73	.37	.36	rules of games and sporting contests
30.	.59	.12	.47	.88	.44	.44	.73	.46	.27	placing objects in correct order
										Explanations
31.	.78	.06	.72	.34	.00	.34	.42	.10	.32	body functions
32.	.53	.03	.50	.27	.00	.27	.46	.12	.34	natural and supernatural events
33.	.53	.01	.52	.24	.00	.24	.42	.07	.35	mechanical functions
										Stories and Phrases
34.	.51	.03	.48	.68	.17	.51	.51	.17	.34	themes and plots of stories & rhymes
35.	.58	.02	.56	.73	.27	.46	.56	.37	.19	words of songs
36.	.45	.01	.44	.61	.22	.39	.54	.32	.22	words of poems
37.	.47	.06	.41	.51	.29	.22	.56	.29	.27	pledges, sayings, religious passages

Table 4

Percentages of Parents and Teachers Reporting the Use of Methods to Implement Children's Memorization Often and Very Often in Section III of the Instruments

Method	Parents (N=172)	K-1 (N=41)	2-3 (N=41)	χ^2	p
1. Do you make it a practice to repeat over and over again what you want memorized until you think the words are remembered?	.53	.80	.71	13.42	.01
2. Do you have your child/pupils repeat to themselves over and over again what it is you want memorized?	.39	.68	.49	10.70	.01
3. Do you test your child's/pupils' permanent memory by waiting several hours or days before asking for the memorized material?	.63	.78	.85	9.93	.01
4. Do you warn your child/pupils ahead of time that you will test their memory for the things you asked to be memorized?	.13	.59	.83	78.52	.001
5. Do you punish or penalize your child/pupils if they don't memorize what is expected?	.02	.05	.17	19.18	.001
6. Do you warn your child/pupils ahead of time that you will punish or penalize them if they fail to memorize what is expected?	.07	.07	.27	16.40	.001
7. Do you reward your child/pupils if they successfully memorize what is expected?	.63	.88	.83	12.91	.001

Table 4. cont.

Method	Parents (N=172)	K-1 (N=41)	2-3 (N=41)	χ^2	p
8. Do you tell your child/pupils ahead of time that you will reward them for successful memorizing?	.14	.59	.59	64.35	.001
9. Do you have your child/pupils memorize one thing (concept, fact, name, etc.) at a time?	.63	.85	.78	6.50	.05
10. Do you ask your child/pupils to memorize several things at a time?	.26	.29	.36	2.52	N.S.
11. Do you have your child/pupils memorize things in groups rather than individually?	.39	.61	.61	11.18	.01
12. Do you make up stories or rhymes to fit the things your child/pupils are to memorize?	.38	.71	.51	14.33	.001
13. Do you stress only that information that you can show your child/pupils through actual experience or through examples?	.51	.88	.73	20.98	.001

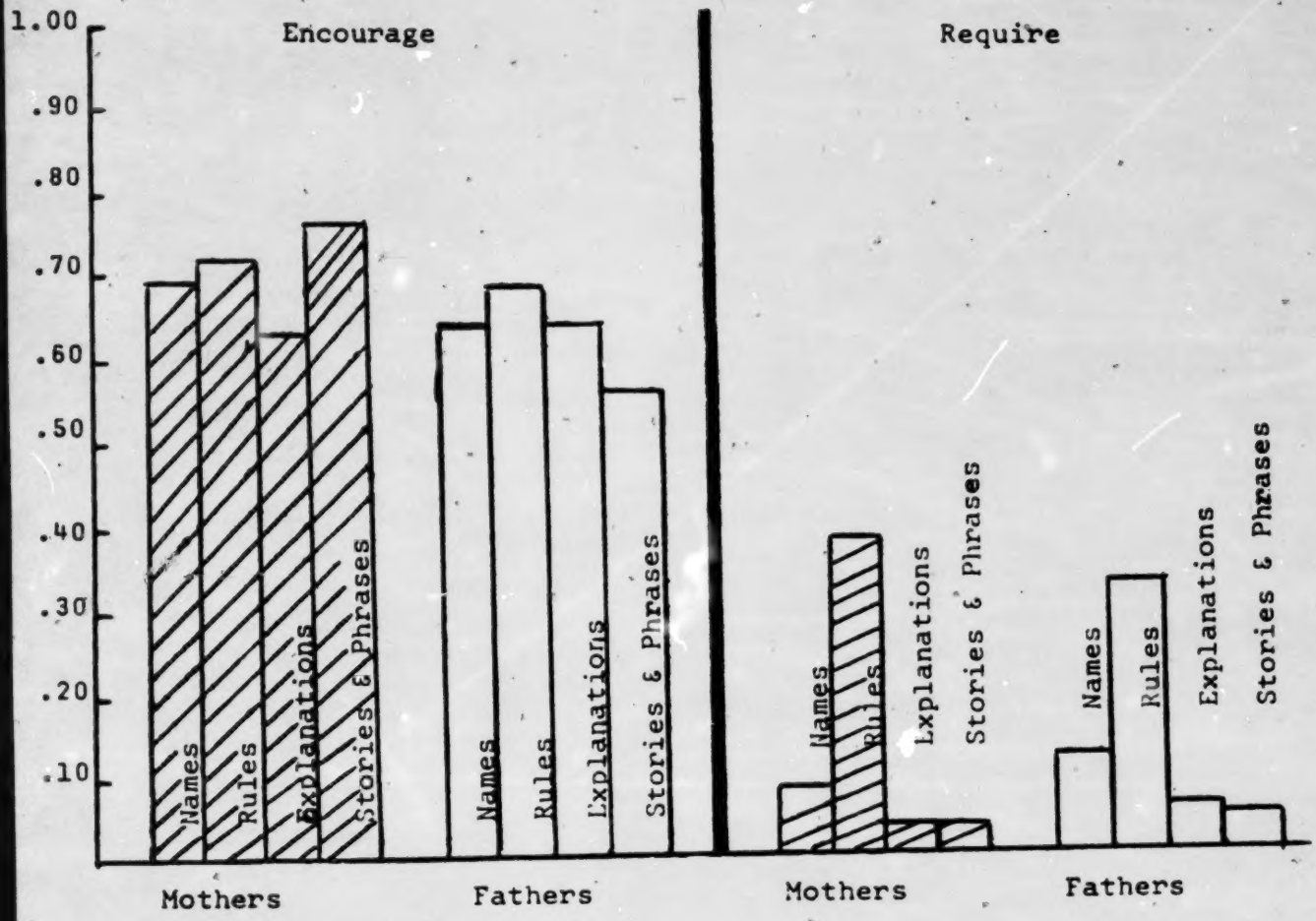

Figure 1. Mean Percentages of Mothers and Fathers Responding that they encourage or require the memorization of various types of knowledge.

Appendix

Features of Memory of Preschool Children

Three - Four Years. At this age all memory activities are accomplished unintentionally since the child does not yet set a goal to memorize or recall. However, the child does exhibit memory abilities in the context of some meaningful (to the child) practical or play activity. The most effective kind of memory ability is recognition with reconstructive abilities improving and recall abilities successful only in a narrow range of situations. The child does much better in remembering poems, stories and songs. The conditions favoring remembrance of material of this type are the large number of repetitions and the clear rhythm. The rhythm helps establish the relation between action and words that is essential for reconstructive memory.

Five Years. This age is characterized by the appearance and gradual development of intentional memorizing and recalling. Yet, goal-setting either by an adult or the child does not mean thtat the child will spontaneously use an appropriate means to memorize or recall -- this occurs later. The child also makes more effective use of knowledge in memory situations and this leads to some evidence of organization of to-be-remembered materials on the basis of similarity. For example, the child, when directed to do so, will group a series of food objects together. In retelling textual material such as a fairy tale, the child reports not only main events, but also details which makes the child's version more like the original.

The development of memory abilities at the preschool age occurs within the context of concrete, meaningful activity-related situations. When a preschool child realizes that he or she cannot complete an activity that he or

she considers necessary and interesting because he or she has forgotten something and this type of situation is repeated often enough, the child's memory strategies and abilities will mature.